

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

<b>In the Matter of</b>	)	
<b>Digital Audio Broadcasting Systems</b>	)	
<b>And Their Impact On the Terrestrial Radio</b>	)	<b>MM Docket No. 99-325</b>
<b>Broadcast Service</b>	)	
	)	

**Reply Comments of Robert A. Meuser**

**INTRODUCTION**

The Commission is deliberating whether to adopt technical standards to permit the transmission of digital audio within the AM and FM broadcast bands and has solicited comments. To date most of the comments that urge the Commission to adopt an in band digital solution on AM frequencies have addressed the need for the technology, the need for a rapid timeline for adaptation and numerous submissions regarding protection of existing AM services. It is a matter of record that the majority of proponents who are broadcasters also have equity in Ibiquity. There also are the submissions from Ibiquity themselves and various manufacturers who wish to develop and market new technology. Despite what should obviously be a strong desire to see their system adopted, no one has adequately addressed how this system will ultimately be able to transition to an all digital mode.

**PROBLEMS RELATING TO INTERFERENCE TO IBOC**

In recent submissions from Clear Channel, ABC/Disney and Glen Clark & Associates, among others, problems with primary IBOC carriers that actually are in the second adjacent channel and would cause interference to others was clearly presented and explained. The other side of the coin that is not addressed is that there is no protection to the Digital signal from analog stations operating on those same second adjacent channels. Part of the Ibiquity architecture depends upon a digital signal that is twice the necessary bandwidth to provide redundant upper and lower sideband signals. If one set is impaired the other set provides service. The problem is that of insuring a robust digital broadcast

service that can succeed in the marketplace to the point where a transition to a more spectrally efficient all digital service is possible. If that transition never occurs, both digital and analog services will be negatively impacted. The urgent need expressed by many for a digital service will be negatively impacted by a stalemate.

Glen Clark and Associates submitted material that illustrates various instances of digital to analog interference. They also describe a matrix and suggest 64 cases are necessary to describe interference to and from digital broadcasting in any one given allocation. In their submission they show how a second adjacent station would experience interference to the analog signal depending in part on receiver bandwidth. The submission did not detail the reverse case of what would happen to the digital signal.

An analog AM station that fits within the required NRSC mask has very high energy out to the 10 kilohertz limits of the upper and lower sidebands. While a digital signal may or may not impair analog reception, many second adjacent allocations will destroy the digital information. In the case of a market where two local stations are spaced 40 kilohertz a distant station could be on the second adjacent between the two stations. Since there can be as much as a 30 db undesired to desired signal ratio for the analog signals, IBOCs second adjacent carrier could be as much as 55 db below the interfering station (61 db under the Clear Channel recommendation). In such instance, the distant station would lose digital coverage in the direction of the two second adjacent stations as far back as the 15 mv/m contours. Conversely, the two local stations would lose half their digital carriers to their 15 mv/m contours in the direction of the distant interferer.

The case becomes more complicated when directional antennas are used. The Commission approves directional antennas based only on their performance at carrier. Sideband performance of directional antennas can vary by more than 20 db, especially near nulls. To date, documented performance of existing directional antennas at +/- 15 kilohertz does not exist, at least not at the commission. This along with the many variations in existing analog allocations makes it next to impossible to predict the true digital coverage of any digital service. To date, Ibiquity has submitted data from one mildly directional station and an omni directional experimental station.

A matrix of 64 cases to solve coverage issues may in fact be way too modest if a digital service that actually works for the general public is to be realized.

### **A CHANGE IN APPROACH IS NECESSARY**

IBOC has always been proposed as an addition to the AM signal that would not require additional regulation on the part of the Commission. Focus has always been on how the digital signals could be made to not significantly interfere with

existing analog services and that could be regulated under current commission rules. Over time the bandwidth of the digital signal has increased to the point that digital service will not be on a station's assigned channel until many years have passed and a transition to all digital becomes possible. We could call this approach as being the permissive approach.

If digital broadcasting is to succeed or in fact survive to a practical transition point the commission must find a way to regulate and license the digital service. A full analysis of each station's digital coverage, complete with directional antenna performance at digital frequencies would be necessary. Digital protection standards must be developed and enforced. In another words if the public interest is to be protected, the commission must be very involved with each digital application, not only to protect the analog listener but to also protect the consumer who invests in the new digital "standard".

### **MEDIUM WAVE SERVICE IS VITAL TO THE NATIONAL INTEREST**

It has been mentioned in these proceedings the importance of AM radio following the events of 9/11/2001. What was not mentioned that in New York City the centralized VHF/UHF transmission site put the majority of TV stations off the air. Were it not for problems with FM transmission from the World Trade Center most FM stations would have also been knocked out. In fact had there been a third airplane, all VHF/UHF and FM broadcasting would have been wiped out. In many markets VHF, UHF and FM service is in a similar centralized arrangement. Medium wave transmission is the only broadcast service in this country that is decentralized and thus much more difficult to shut down entirely. It also has the ability to reach great distances and possibly people who may not have other service available for some reason. After the events of the last year this is something that must be kept in mind.

It is important that service at these frequencies be kept robust and widely available. Digital technology offers many ways to achieve these goals and enhance both opportunities for broadcasters and benefits to the general public. Regardless of what digital approach is ultimately approved, the Commission must separately regulate and nourish its rollout. The permissive approach will not produce a successful digital transition.

### **AN ALTERNATE SOLUTION**

The proposed Ibiquity digital plan operates in effect over 4 channels. It is possible to initiate digital broadcasting within less than half of the existing NRSC channel and overlapping half of one adjacent channel. The world standard Radio Mondiale initiative can meet this objective. It would also keep medium wave radios "world standard". This would be a benefit to manufacturers (keeping production cost lower) and the general public by keeping MW radios a basic world standard.

If the Commission established a band plan where stations operated in a VSB mode, space could be made for digital broadcasting without exceeding the present NRSC bandwidth of a station. This would make it much easier to allocate and regulate. In such a plan, stations would utilize USB operation. Stations would operate DSB to 2 khz and full bandwidth on one sideband but not the other. Optimally a band plan would have 540 operating VSB with full analog fidelity falling on the lower sideband. 550 khz would operate VSB with full fidelity on the USB. A 6 khz "hole" would exist between 2 stations where the initial digital signal could be placed. This pattern would repeat up the band. An interim benefit would be some reduced interference to stations both day and night even in analog mode. Another advantage is that digital signals of the Mondiale protocol can improve digital protection by means of precision offset. This means that a purposefully regulated digital radio system could come to fruition in both day and night modes. It is essential that digital MW broadcasting is robust day and night and is capable of evolving into a single standard for the band.

## **CONCLUSION**

The present proposed system by Ibiquity does not address robust protection of the new digital technology during an unknown transition period.

The Commission will have to take an extremely hands on position to assure that digital licensees provide a solid protected service necessary for digital radio to evolve.

The present Ibiquity proposal will require intensive Commission involvement if it were to succeed.

Other more technically viable solutions exist. They are world standard and will be less costly to implement and more in the public interest

Respectfully submitted

Robert A. Meuser